

Plasma Flow Control for Drag Reduction, Phase II

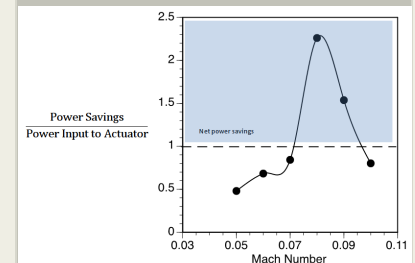
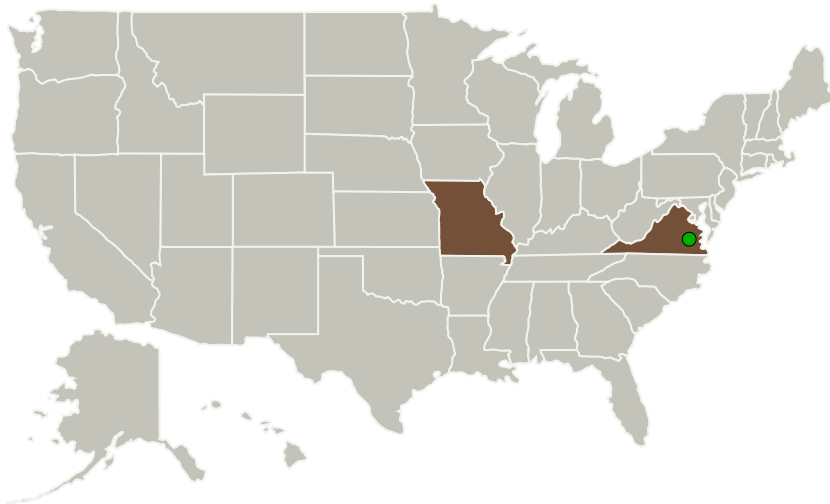
Completed Technology Project (2016 - 2018)



Project Introduction

This Phase II SBIR project deals with advancing the design, development, and testing of an innovative drag reduction concept named "Smart Longitudinal Instability Prevention via Plasma Surface" using a new revolutionary plasma actuator technology developed at the University of Notre Dame (UND). During Phase I, Innovative Technology Applications Company (ITAC), LLC and researchers from UND developed and demonstrated drag reduction of more than 65% in turbulent boundary layers using the SLIPPS approach. This approach intervenes in the Streak Transient Growth Instability mechanism which is a dominant mechanism in the production of drag in turbulent boundary layer flows. In Phase II, we will investigate and test the use of SLIPPS concept at both higher Mach number and Reynolds number flows, as well as build an improved understanding of the physics in order to make even further efficiency gains possible. Phase III will advance the TRL to a level suitable for flight tests and integration into production systems.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Innovative Technology Applications Co.	Lead Organization	Industry	Chesterfield, Missouri
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Missouri	Virginia

Project Transitions

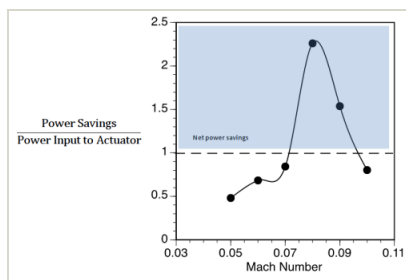
▶ **May 2016:** Project Start

✓ **November 2018:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139781>)

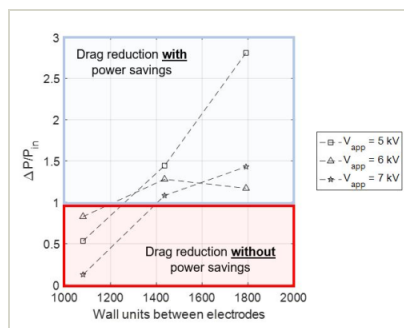
Images



Briefing Chart Image

Plasma Flow Control for Drag Reduction, Phase II

(<https://techport.nasa.gov/image/128799>)



Final Summary Chart Image

Plasma Flow Control for Drag Reduction, Phase II

(<https://techport.nasa.gov/image/127514>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innovative Technology Applications Co.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Christopher C Nelson

Co-Investigator:

Chris Nelson

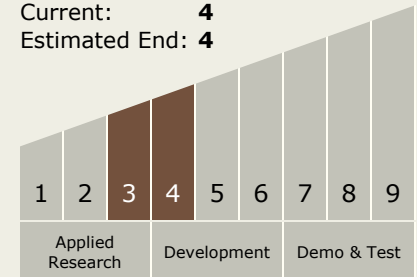
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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - └ TX15.1 Aerosciences
 - └ TX15.1.5 Propulsion Flowpath and Interactions

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System